

Practice and attitudes of infection control staff towards diagnostic stewardship measures

Diagnostic Stewardship: Wissen und Einstellungen von Hygienefachpersonal

Abstract

Introduction: In recent years, diagnostic stewardship has gained importance worldwide as part of antibiotic stewardship and infection control programs. However, the specific involvement of infection control (IC) teams in this area has not been studied.

Method: A volunteer survey of participants at the 2024 Freiburg Conference on Infection Prevention and Therapy was conducted to assess attitudes and practices regarding diagnostic stewardship.

Results: The majority of the 182 participants worked in German hospitals with established IC-committees (91.2%), antibiotic stewardship teams (43.4%), and laboratory commissions (24.7%).

For sepsis diagnosis, at least two pairs of blood cultures are usually taken, which is in line with the guidelines; 14.3% use the “six-pack” rule (three pairs), and 28.6% take all cultures from one puncture site. For many clinical tests –except of stool tests and C-reactive protein – less than 50% rated their use as “appropriate”, indicating a need for improvement. Interleukin 6 and beta-D-glucan are rarely used.

Strategies such as reflex tests and cascade reporting are only used occasionally and are viewed with scepticism in some cases. Screening for methicillin resistant *Staphylococcus aureus* and Vancomycin resistant enterococci was rated as “appropriate” by over 60%, while screening for multidrug-resistant Gram-negative bacteria was rated as such by 50%. In the area of IC, 32.4% reported inadequate sampling of surfaces and 33.2% of staff hands.

Discussion: Subjective assessments and a heterogeneous participant structure limit the survey, and subgroup analyses are not possible due to the small number of cases. However, the results show chances for education and integration of IC teams in diagnostic stewardship programs.

Keywords: diagnostic stewardship, antibiotic stewardship, infection control team

Zusammenfassung

Einleitung: In den letzten Jahren hat das so genannte Diagnostic Stewardship im Rahmen von Antibiotic Stewardship- und Infektionskontrollprogrammen weltweit an Bedeutung gewonnen. Die spezifische Einbindung der Hygieneteams in diesen Bereich ist jedoch wenig untersucht.

Methode: Im Rahmen einer Umfrage unter Teilnehmenden der Freiburger Infektiologie- und Hygienekongresses 2024 wurden Einstellungen und Praktiken zum Thema Diagnostic Stewardship erfasst.

Ergebnisse: Die Mehrheit der 182 Teilnehmenden arbeitete in deutschen Krankenhäusern mit etablierten Hygienekommissionen (91,21%), Antibiotic Stewardship-Teams (43,41%) und Laborkommissionen (24,73%). Bei der Sepsisdiagnostik werden meist mindestens zwei Blutkulturpaare entnommen, was den Leitlinien entspricht; 14,29% nutzen die „Six-Pack“-Regel (drei Paare), 28,57% nehmen alle Kulturen aus einer

Sebastian
Schulz-Stübner^{1,2,3}
Teresa Tamayo¹

1 German Consulting Center
for Infection Prevention and
Control, Freiburg i.Brsg.,
Germany

2 Clinic for Anesthesiology and
Critical Care, University
Medical Center Freiburg,
University Freiburg, Freiburg
i. Brsg., Germany

3 University of Education,
Freiburg i. Brsg., Germany

Punktionsstelle ab. Bei vielen klinischen Tests – mit Ausnahme von Stuhluntersuchungen und CRP – bewerteten weniger als 50% die Nutzung als „angemessen“, was auf Verbesserungsbedarf hinweist. IL-6 und Beta-D-Glucan werden selten verwendet.

Strategien wie Reflex-Tests und gesteuerte Antibiotigramme werden nur gelegentlich verwendet und teils skeptisch betrachtet. Das Screening auf Methicillin resistente *Staphylococcus aureus* und Vancomycin resistent Enterokokken wurde von über 60% als „angemessen“ bewertet, beim Screening auf multiresistente Gram-negative Erreger von 50%. Bei den hygienespezifischen Fragen bewerteten 32,4% eine Probenahmen von Oberflächen und 33,2% von den Händen des Personals als „zu wenig“.

Diskussion: Die Umfrage ist durch die subjektiven Einschätzungen der Teilnehmenden und eine heterogene Teilnehmerstruktur limitiert, zudem sind Subgruppenanalysen aufgrund geringer Fallzahlen nicht möglich. Die Ergebnisse zeigen Verbesserungspotential hinsichtlich der Einbindung der Hygieneteams beim Thema Diagnostic Stewardship und auch bei der Probenahme von Oberflächen und Händen.

Schlüsselwörter: Diagnostic Stewardship, Antibiotic Stewardship, Infektionskontrollteam

Introduction

In recent years, diagnostic stewardship has gained attention as part of antibiotic stewardship and infection control programs worldwide [1], [2], [3], [4], [5]. However, the involvement of infection control (IC) staff in these activities remains unclear and is not reported in the literature.

Method

To analyse the practice and attitudes regarding diagnostic stewardship among members of IC teams, we conducted a survey among visitors during the annual Freiburg conference of infection prevention and therapy 2024. Each participant agreed to take the survey and data-sheets (Attachment 1) were collected anonymously in drop-off-boxes.

Results

Table 1 shows the summary of the survey's questions and the frequency of responses. Most of the 182 participants worked in German hospitals. Respondent's institutions had an IC board, antibiotic stewardship teams, and a lab-commission specialized in diagnostic tests in 91.2%, 43.4%, and 24.7% respectively.

In most institutions a minimum of two pairs of blood cultures (BC) are taken for diagnosis of sepsis which is in accordance with current clinical guidelines. 14.3% have established the “six pack” rule (three pairs of BC) and 28.6% report collecting all blood cultures from a single puncture as recommended by emerging literature.

For most clinical test items with exception of stool testing and CRP, less than 50% of respondents felt that the utilization is “just right”, indicating relevant potential for improvement. IL 6 and Beta-D-Glucan are rarely utilized.

Diagnostic stewardship strategies like reflex testing and cascade reporting of resistance profiles are used only occasionally and sometimes met with scepticism.

Screening for MRSA and VRE was judged as “just right” by more than 60% of respondents, screening for multiresistant Gram-negative bacteria by 50%.

In the IC-related questions, 32.4% of respondents consider the amount of sampling to be insufficient regarding surface sampling while 33.2% believe the same for sampling from hands of staff.

Discussion

While the relatively high number of “unclear” answers in the specific test related questions can be explained by lack of involvement of the IC-Team members in clinical decision making, it also demonstrates the need for a more integrative approach between antibiotic stewardship and infection prevention.

The large number of respondents considering microbiological hand sampling as “not enough” came as a surprise considering much better educational tools for hand hygiene monitoring and motivation like real time fluorescent or dye-based visualization techniques; similarly, environmental surface sampling was often regarded as insufficient, although routine environmental sampling of surfaces is not recommended [6]. Van der Schoor et al. [7] conducted a web-based survey regarding environmental sampling in which most respondents were clinical microbiologists or infection prevention and control practitioners, and 57.3% were from either the Netherlands, the United Kingdom, or Ireland. Respondents had high self-reported

Table 1: Surveyed characteristics of participants and their evaluation of infection control and diagnostic stewardship guidelines and activities (n=182*)

Characteristics	Frequency (%) or mean
Age (three missings)*	53.5
Female gender (two missings)*	71.4%
Position: Infection control practitioner (ICP) Infection control (IC) physician IC-link nurse IC liaison physicians Antibiotic stewardship (ABS) coordinators Clinician without IC or ABS function	50.6% 20.9% 5.0% 12.1% 6.0% 5.5%
Workplace – size of hospital: < 200 beds 201–400 beds 401–600 beds > 600 beds Rehabilitation clinic Other workplace	18.7% 26.9% 19.2% 23.1% 10.4% 1.7%
Country of work (one missing)* Germany Austria Switzerland	96.2% 0.6% 2.8%
Infection control board established	91.2%
ABS-Team established	43.4%
Blood culture (BC) guidelines when sepsis is suspected	
How many pairs of BC should be taken according to hospital guidelines? one pair two pairs three pairs none (or no guideline)	7.1% 73.1% 14.3% 5.5%
Guideline on number of punctures per blood culture collection single puncture two punctures three punctures	28.6% 59.9% 11.5%
Presence and frequency of DTTP¹ determination Yes, but rarely Yes, frequently Never/unknown	25.3% 34.1% 40.7%
General evaluation of excessive or insufficient microbiological diagnostics	
Blood cultures Too many Not enough Just right Don't know	7.1% 39.0% 44.5% 9.3%
Urine dipstick test Too many Not enough Just right Don't know	21.4% 11.5% 28.0% 39.0%
Urine culture (microbiology) Too many Not enough Just right Don't know	31.9% 21.4% 31.3% 15.4%
Stool test for pathogenic microorganisms Too many Not enough Just right Don't know	15.4% 17.0% 53.9% 13.7%
Stool examination for <i>Clostridioides difficile</i> (two missings)* Too many Not enough Just right Don't know	5.5% 18.7% 62.1% 12.6%
Multiplex PCR for diarrheal pathogens (two missings)* Too many Not enough Just right Don't know	11.5% 17.0% 29.1% 41.2%

(Continued)

Table 1: Surveyed characteristics of participants and their evaluation of infection control and diagnostic stewardship guidelines and activities (n=182*)

Characteristics	Frequency (%) or mean
General evaluation of excessive or insufficient microbiological diagnostics	
Multiplex-PCR for respiratory pathogens (two missings)*	
Too many	8.9%
Not enough	22.5%
Just right	34.1%
Don't know	33.5%
Legionella antigen (urine)	
Too many	5.0%
Not enough	28.8%
Just right	37.4%
Don't know	31.9%
Pneumococcal antigen (urine)	
Too many	1.1%
Not enough	21.4%
Just right	25.8%
Don't know	51.7%
Deep respiratory material	
Too many	8.2%
Not enough	21.4%
Just right	43.4%
Don't know	26.9%
Sputum culture (microbiology)	
Too many	8.8%
Not enough	20.9%
Just right	34.1%
Don't know	36.3%
Procalcitonin	
Too many	9.9%
Not enough	15.4%
Just right	35.2%
Don't know	39.6%
C-reactive protein (CRP)	
Too many	23.1%
Not enough	1.7%
Just right	54.4%
Don't know	20.9%
Interleukin 6 (IL 6)	
Too many	2.2%
Not enough	8.8%
Just right	10.4%
Don't know	78.6%
Beta-D-Glucan	
Too many	0.6%
Not enough	13.2%
Just right	5.5%
Don't know	80.8%
Differential blood count	
Too many	3.9%
Not enough	17.6%
Just right	48.9%
Don't know	29.7%
Evaluation of protocols for reflex testing and guided antibiograms/cascade reporting	
Guided antibiograms/cascade reporting	
Never heard of it	36.8%
Already established	34.2%
Positive evaluation but too much work	15.9%
Negative evaluation (delivery of information delayed)	1.1%
Don't know	12.1%
Reflex testing: urine	
Never heard of it	63.7%
Already established	8.8%
Positive evaluation but too much work	12.6%
Negative evaluation (medical decision)	1.1%
Don't know	13.7%

(Continued)

Table 1: Surveyed characteristics of participants and their evaluation of infection control and diagnostic stewardship guidelines and activities (n=182*)

Characteristics	Frequency (%) or mean
Evaluation of protocols for reflex testing and guided antibiograms/cascade reporting	
Reflex testing: stool	
Never heard of it	64.3%
Already established	12.1%
Positive evaluation but too much work	9.9%
Negative evaluation (medical decision)	1.1%
Don't know	12.6%
Evaluation of infection control-related sampling	
MRSA² Screening	
Too many	7.1%
Not enough	30.8%
Just right	61.5%
Unclear/not recommended	0.6%
VRE³ Screening	
Too many	7.1%
Not enough	29.7%
Just right	60.4%
Unclear/not recommended	2.8%
Multiresistant Gram-negative bacteria screening	
Too many	4.4%
Not enough	44.5%
Just right	50.0%
Unclear/not recommended	1.1%
Environmental sampling: surfaces	
Too many	4.4%
Not enough	32.4%
Just right	38.5%
Unclear/not recommended	24.7%
Environmental sampling: hands of staff	
Too many	0.6%
Not enough	33.3%
Just right	16.5%
Unclear/not recommended	49.2%

*total percentages account for all data, including missing answers.

¹Differential time to positivity²Methicillin resistant *Staphylococcus aureus*³Vancomycin resistant enterococci

knowledge, which was not consistent with their response to certain questions. There was no consensus on sample sites, neither within nor between countries [7]. Obviously, the same uncertainty exists in Germany.

Conclusion

The results indicate that German IC teams need more education and practical involvement in diagnostic stewardship activities not only in the context of antibiotic stewardship but also in their own field, given the high levels of uncertainty regarding environmental samples and hand hygiene related sampling.

Limitations

Our study is limited by the subjective nature of the answers and the large variety of professions. Overall, numbers in surveyed healthcare professions were too small for subgroup-analyses.

Notes

Authors' ORCIDs

- Schulz-Stübner S: 0000-0001-5210-9364

Ethical approval

At a conference, participants agreed to participate in the voluntary anonymous survey.

Funding

This work was funded by institutional funds only.

Competing interests

The authors declare that they have no competing interests.

Attachments

Available from <https://doi.org/10.3205/dgkh000601>

1. Attachment1_dgkh000601.pdf (168 KB)
Survey items

References

1. Fabre V, Davis A, Diekema DJ, Granwehr B, Hayden MK, Lowe CF, Pfeiffer CD, Sick-Samuels AC, Sullivan KV, Van Schooneveld TC, Morgan DJ. Principles of diagnostic stewardship: A practical guide from the Society for Healthcare Epidemiology of America Diagnostic Stewardship Task Force. *Infect Control Hosp Epidemiol.* 2023 Feb;44(2):178-85. DOI: 10.1017/ice.2023.5
2. Claeys KC, Johnson MD. Leveraging diagnostic stewardship within antimicrobial stewardship programmes. *Drugs Context.* 2023 Feb 20;12:2022-9-5. DOI: 10.7573/dic.2022-9-5
3. Schulz-Stübner S. Diagnostic Stewardship [Diagnostic Stewardship - The right test for the right patient with the right consequences]. *Anesthesiol Intensivmed Notfallmed Schmerzther.* 2023 Sep;58(9):540-50. German. DOI: 10.1055/a-2154-1215
4. Zakhour J, Haddad SF, Kerbage A, Wertheim H, Tattevin P, Voss A, Ünal S, Ouedraogo AS, Kanj SS; International Society of Antimicrobial Chemotherapy (ISAC) and the Alliance for the Prudent Use of Antibiotics (APUA). Diagnostic stewardship in infectious diseases: a continuum of antimicrobial stewardship in the fight against antimicrobial resistance. *Int J Antimicrob Agents.* 2023 Jul;62(1):106816. DOI: 10.1016/j.ijantimicag.2023.106816
5. Jinks T, Subramaniam S, Bassetti M, Gales AC, Kullar R, Metersky ML, Poojary A, Seifert H, Warriar A, Flayhart D, Kelly T, Yu K, Altevogt BM, Townsend A, Marsh C, Willis C. Opportunities to Enhance Diagnostic Testing and Antimicrobial Stewardship: A Qualitative Multinational Survey of Healthcare Professionals. *Infect Dis Ther.* 2024 Jul;13(7):1621-37. DOI: 10.1007/s40121-024-00996-1
6. Sehulster L, Chinn RY; CDC; HICPAC. Guidelines for environmental infection control in health-care facilities. Recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC). *MMWR Recomm Rep.* 2003 Jun 6;52(RR-10):1-42.
7. van der Schoor AS, Boyle M, Voor In 't Holt AF, Vos MC, Humphreys H; ESCMID Study Group for Nosocomial Infections. Environmental sampling of innate hospital surfaces: a survey of current practices and the need for guidelines. *J Hosp Infect.* 2022 Oct;128:92-5. DOI: 10.1016/j.jhin.2022.07.024

Corresponding author:

Prof. Dr. med. Sebastian Schulz-Stübner
German Consulting Center for Infection Prevention and Control, Schnewlinstr. 4, 79098 Freiburg im Breisgau, Germany; Phone: +49 0761-2026780
Schulz-stuebner@bzh-freiburg.de

Please cite as

Schulz-Stübner S, Tamayo T. Practice and attitudes of infection control staff towards diagnostic stewardship measures. *GMS Hyg Infect Control.* 2025;20:Doc72.
DOI: 10.3205/dgkh000601, URN: urn:nbn:de:0183-dgkh0006018

This article is freely available from

<https://doi.org/10.3205/dgkh000601>

Published: 2025-11-28

Copyright

©2025 Schulz-Stübner et al. This is an Open Access article distributed under the terms of the Creative Commons Attribution 4.0 License. See license information at <http://creativecommons.org/licenses/by/4.0/>.